

backwash fluid through the U-tube inlet port and outflowing the backwash fluid through the outlet ports of each compartment.

12. (New) The liquid separation apparatus of claim 6 wherein the partition does not extend to a lower end of the column for defining the U-tube portion between the compartments and allowing for the fluid communication between the compartments

### REMARKS

The above amendments and these remarks are responsive to the Office Action mailed on May 8, 2002. Claim 6 has been amended for clarity. Claim 12 has been added and is directed to subject matter disclosed in the specification as originally filed. No new matter has been added. Claims 6-12 are now pending in this application. Reconsideration on the basis of the above amendments and remarks below is kindly requested.

Firstly, applicant wishes to thank the Examiner for the telephonic interview with applicant's undersigned attorney on September 9, 2002.

The Examiner objected to the proposed amendment to the drawings as depicted in Figure 10 in that it introduces new matter because it did not appear that there was any suggestion in the disclosure as originally filed that the embodiment in the original illustration on page 7 and the embodiment disclosed on page 6 lines 30-33 can be combined to arrive at the embodiment shown in Figure 10. While applicant respectfully disagrees, in a proposed amendment to the drawings being filed concurrently herewith under separate cover, Figure 10 has been amended to now depict the original illustration of page 7. Thus, applicant submits that the objection to the drawings has now been overcome.

The Examiner rejected claim 6 under 35 USC §102(b) as being anticipated by Seibel, U.S. Patent No. 4,719,010. Claim 6 is directed to an apparatus for conducting liquid separation comprising a liquid separation column comprising a partition within the column dividing the column into first and second vertical compartments, each compartment including an upper fluid inlet port in the top of the compartment wherein the inlet ports are in full communication with the interior of the compartments and an external fluid source. The claim also requires that each

compartment is equipped with an upper bed disposed inside the compartment below the inlet ports and that the upper beds have fluid distribution nozzles wherein fluid received from the inlet ports is directed into the compartments at a controlled flow rate. Furthermore, claim 6 requires that each compartment includes an outlet port for backwashing disposed adjacent to and below each upper bed, wherein the outlet ports remove particular matter larger than the upper bed nozzle openings. The claims also require that a U-tube portion of the liquid separation column between the compartments includes a lower fluid inlet port which is in communication with both the first and second vertical compartments and an ion exchange resin disposed within each vertical compartment. Seibel according to the examiner discloses an apparatus comprising two compartments 10 and 10' for rinsing a fixed bed ion exchanger. Seibel does not disclose a column comprising a partition within the column dividing the column into two vertical compartments as required by claim 6. Furthermore, the Seibel apparatus has a lower fluid inlet port located at the lower end of the column not an upper inlet fluid port as required by claim 6. In addition, Seibel does not appear to teach that the outlet ports remove particle matter larger than the bed nozzle openings as required by claim 6. Thus, applicant submits that claim 6 is not anticipated by Seibel for either of the aforementioned reasons..

Claims 7-12 are directly or indirectly dependent from claim 6. Claim 6 is believed to be in condition for allowance over Seibel. Thus, applicant submits that claims 7-12 are also in condition of allowance over Seibel as being dependent from an allowable base claim and for the additional limitations they contain therein. For example, claims 8-11 require "pumping service fluid through the inlet port of the first compartment down through the ion exchange resin layer of the first compartment and up through the ion exchange layer of the second compartment, . . ." In other words, the fluid goes down through the first compartment and up through the second compartment indicating that the flow between the compartments is in series. The flow between the alleged compartments disclosed in Seibel however is in parallel, i.e., flow through both compartments is upward. Thus applicant submits that claims 8-11 are also allowable over Seibel for this additional reason.

Furthermore, neither West, Astrom nor Roberts disclose, teach or suggest the limitations of claims 6-12. For example, neither West nor Roberts disclose a column comprising a partition dividing the column into two compartments as required by claims 6-12. Furthermore, Astrom does not disclose that each compartment includes "an outlet port for backwashing, each outlet port

being disposed adjacent to and below each upper bed" as required by claims 6-12. Thus, applicant submits that claims 6-12 are allowable over Seibel, West, Astrom, of Roberts alone or in combination.

In the Office action mailed on May 8, 2002, the Examiner rejected claim 6 under 35 USC §103(a) as being unpatentable over Astrom in view Roberts. According to the Examiner, Astrom discloses the claimed invention with the exception of the recited outlet port below each individual bed. Roberts, according to the Examiner, discloses a similar ion exchange system, and discloses means for backwashing the ion exchange material contained therein in the recited manner. Consequently, the Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of Astrom with a backwashing means of Roberts in order to obtain the advantages disclosed by the secondary reference. Applicant respectfully disagrees. Astrom discloses an apparatus for treating liquid and specifically teaches on column 2, lines 28-42 a way of washing the apparatus. Roberts discloses an upflow regeneration system. The Roberts system does not include a liquid separation column divided into a first and second vertical compartments. Roberts does not disclose, teach or suggest that his backwashing system can be incorporated in a liquid separation column comprising two vertical compartments. In fact, one skilled in the art reading both Astrom and Roberts would be dissuaded from using the backwashing system of Roberts with Astrom since Astrom already teaches a specific way of washing his system without requiring an outlet port for backwashing. Thus, there would be no need to incorporate the alleged backwashing system and alleged outlet port of Roberts into the system of Astrom. Thus, applicant submits that claim 6 does not render obvious by Astrom in view of Roberts.

Furthermore, claim 6 requires that the outlet ports remove particular matter larger than the upper bit nozzle openings. Neither Astrom nor Roberts disclose, teach or suggest the use of outlet ports that allow the removal of particular matter that is larger than the upper bed nozzle openings as required by claim 6. As such, applicant submits that claim 6 is not rendered obvious by Astrom in view of Roberts for this additional reason.

The rejections to all claims pending in this application are believed to have been overcome and this application is now believed to be in condition for allowance. Should the Examiner have any remaining questions or concerns about the allowability of this application, the Examiner is kindly requested to call the undersigned attorney to discuss them.

Application No. 09/582,175

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

Respectfully submitted,  
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Version with Markings to Show Changes Made

In the Claims:

Amend claim 6 as follows:

6. (Thrice Amended) An apparatus for conducting liquid separation utilizing an ion exchange process, the apparatus comprising:

a liquid separation column, the column comprising a partition within the column dividing the column, [being divided] into first and second vertical compartments, the vertical compartments being joined at their lower ends to form a U-tube portion between the compartments, wherein the first and second compartments are in fluid communication;

each vertical compartment including an upper fluid inlet port located in the top of the compartment, the inlet ports being in fluid communication with the interior of the compartments and an external fluid source;

each vertical compartment being equipped with an upper bed disposed inside each compartment, the beds being proximate to the upper end of the compartments and below the inlet ports;

the upper beds having fluid distribution nozzles, wherein fluid received from the inlet ports is directed into the compartments at a controlled flow rate;

each compartment further including an outlet port for backwashing, each outlet port being disposed adjacent to and below each upper bed, wherein the outlet ports remove particulate matter larger than the upper bed nozzle openings;

the U-tube portion between the compartments including a lower fluid inlet port, wherein the lower fluid inlet port is in fluid communication with both the first and second vertical compartments; and[;]

an ion exchange resin layer disposed within each vertical compartment, wherein a free board is defined between a top level of the ion exchange resin layer and the upper bed in each compartment, whereby the free board allows the resin layer to expand and contract during the liquid separation process.